Practitioner's Docket No. 445

CHAPTER II

Preliminary Classification:
Proposed Class:
Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P., § 601, 7th ed.

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/IB 99/00267	15 February 1999	20 February 1998
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED

METHOD FOR STERLIZING MATERIALS AND ARTICLES AND A DEVICE FOR IMPLEMENTING THE SAME
TITLE OF INVENTION

RUSTAM RAKHIMOV
APPLICANT(S)

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231

ATTENTION: EO/US

CERTIFICATION UNDER 37 C.F.R. § 1.10*
(Express Mail label number is mandatory.)
(Express Mail certification is optional.)

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith is being deposited with the United States Postal Service on this date August 18, 2000, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EK473444496US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Robert Charles Hill
(type or print name of person mailing paper)

Robert Charles Hill
Signature of person mailing paper

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

****WARNING:*** *Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).*
*"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.*

NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

WARNING: *Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing—See 37 C.F.R. § 1.8.*

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 U.S.C. § 371 otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(f).

I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. § 371:

a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).

b. ☒ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
☐*	TOTAL CLAIMS	7 -20=	--	× $18.00=	$ --
	INDEPENDENT CLAIMS	2 -3=	--	× $78.00=	--
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) 1			+ $260.00	260.00
BASIC FEE**	☐ U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: ☐ and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 C.F.R. § 1.492(a)(4)) ..... $96.00 ☐ and the above requirements are not met (37 C.F.R. § 1.492(a)(1)) ..... $670.00 ☒ U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: ☐ has been paid (37 C.F.R. § 1.492(a)(2)) ..... $690.00 ☐ has not been paid (37 C.F.R. § 1.492(a)(3)) ..... $970.00 ☒ where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 C.F.R. § 1.492(a)(5)) $840.00				840.00
	Total of above Calculations				=1,100.00
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (note 37 C.F.R. § 1.9, 1.27, 1.28)				- 550.00
	Subtotal				550.00
	Total National Fee				$ 550.00
	Fee for recording the enclosed assignment document $40.00 (37 C.F.R. § 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				--
TOTAL	Total Fees enclosed				$ 550.00

*See attached Preliminary Amendment Reducing the Number of Claims.

i. ☒ A check in the amount of 550.00 to cover the above fees is enclosed.

ii. ☐ Please charge Account No. _____ in the amount of $ _____. A duplicate copy of this sheet is enclosed.

***WARNING:** *"To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).*

WARNING: *If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.*

3. ☒ A copy of the International application as filed (35 U.S.C. § 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

a. ☒ is transmitted herewith.

b. ☐ is not required, as the application was filed with the United States Receiving Office.

c. ☒ has been transmitted

i. ☒ by the International Bureau.
Date of mailing of the application (from form PCT/1B/308): August 26, 1999.

ii. ☐ by applicant on _____.
Date

4. ☒ A translation of the International application into the English language (35 U.S.C. § 371(c)(2)):

a. ☐ is transmitted herewith.

b. ☒ is not required as the application was filed in English.

c. ☐ was previously transmitted by applicant on _____.
Date

d. ☐ will follow.

5. ☒ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. § 371(c)(3)):

NOTE: The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.

a. ☒ are transmitted herewith.

b. ☐ have been transmitted

i. ☐ by the International Bureau.
Date of mailing of the amendment (from form PCT/1B/308): _____.

ii. ☐ by applicant on (date) _____.
Date

c. ☐ have not been transmitted as

i. ☐ applicant chose not to make amendments under PCT Article 19.
Date of mailing of Search Report (from form PCT/ISA/210.): _____.

ii. ☐ the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. ☒ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. § 371(c)(3)):

a. ☐ is transmitted herewith.

b. ☒ is not required as the amendments were made in the English language.

c. ☐ has not been transmitted for reasons indicated at point 5(c) above.

7. ☒ A copy of the international examination report (PCT/IPEA/409)

☒ is transmitted herewith.

☐ is not required as the application was filed with the United States Receiving Office.

8. ☒ Annex(es) to the international preliminary examination report

a. ☒ is/are transmitted herewith.

b. ☐ is/are not required as the application was filed with the United States Receiving Office.

9. ☒ A translation of the annexes to the international preliminary examination report

a. ☐ is transmitted herewith.

b. ☒ is not required as the annexes are in the English language.

10. ☒ An oath or declaration of the inventor (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115

a. ☐ was previously submitted by applicant on _____.
Date

b. ☒ is submitted herewith, and such oath or declaration

i. ☐ is attached to the application.

ii. ☒ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. § 1.70.

c. ☐ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):

a. ☒ is transmitted herewith.

b. ☐ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____.

c. ☐ is not required, as the application was searched by the United States International Searching Authority.

d. ☐ will be transmitted promptly upon request.

e. ☐ has been submitted by applicant on _____.
Date

12. ☐ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:

a. ☐ is transmitted herewith.

Also transmitted herewith is/are:

☐ Form PTO-1449 (PTO/SB/08A and 08B).

☐ Copies of citations listed.

b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).

c. ☐ was previously submitted by applicant on _____.
Date

13. ☐ An assignment document is transmitted herewith for recording.

A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

_____

_____

_____

14. ☐ Additional documents:

a. ☐ Copy of request (PCT/RO/101)

b. ☐ International Publication No. _____

i. ☐ Specification, claims and drawing

ii. ☐ Front page only

c. ☐ Preliminary amendment (37 C.F.R. § 1.121)

d. ☐ Other

_____

_____

_____

15. ☒ The above checked items are being transmitted

a. ☒ before 30 months from any claimed priority date.

b. ☐ after 30 months.

16. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on _____, namely:

_____

_____

_____

_____

_____

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: *Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.*

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☐ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. _____.

☐ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: *Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.*

☐ 37 C.F.R. § 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

☐ 37 C.F.R. § 1.17 (application processing fees)

☐ 37 C.F.R. § 1.17(a)(1)–(5) (extension fees pursuant to § 1.136(a).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).

Robert Charles Hill

SIGNATURE OF PRACTITIONER

Reg. No.: 20 903

Robert Charles Hill

(*type or print name of practitioner*)

Tel. No.: (415) 421-2080

235 Montgomery Street #821

P.O. Address

Customer No.:

San Francisco, CA 94104

Docket No 445

Applicant RUSTAM RAKHIMOV

For: METHOD FOR STERILIZING MATERIALS AND ARTICLES AND A DEVICE FOR IMPLEMENTING THE SAME

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1 9(f) AND 1 27(b))
INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled METHOD FOR STERILIZING MATERIALS AND ARTICLES AND A DEVICE FOR IMPLEMENTING THE SAME, described in the specification filed herewith

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1 9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1 9(d) or a nonprofit organization under 37 CFR 1 9(e).

Each person, concern or organization to which I have assigned, granted, conveyed or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

[X] No such person, concern or organization

I acknowledge the duty to file, in this application, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1 28(b))

EK 473 4444 96 US

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon

Rustam Rakhimov
Name of Inventor

Ergashev Street, 54
Tashkent, 700084, Uzbekistan
Address of Inventor

Signature of Inventor

11.08.00
Date

METHOD FOR STERILIZING MATERIALS AND ARTICLES AND A DEVICE FOR IMPLEMENTING THE SAME

The present invention relates to medicine, more particularly, to methods and devices for sterilizing materials and articles, and can be used for sterilizing syringes, scarifiers, scalpels, steel drills and other medical instruments and materials. It can also be used in the food industry for sterilizing containers and packages, in the service industry (at the hairdresser's and barber's), in eating houses for sterilizing tableware, covers, etc., and in the pharmaceutical industry for sterilizing bottles and other containers.

A method for sterilizing articles is known set out in Uzbekistan Patent # 1312, published 30.12.1994.

The method for sterilizing articles, preferably medical instruments, consists in exposing them to pulses of infrared (IR) radiation; in this method IR radiation is generated by a screen coated with a converting layer and the wavelength of the radiation is chosen in a range where water has a maximal absorption coefficient, and the articles are at the same time as receiving pulse IR radiation exposed to continuous IR radiation which is generated at wavelengths $\geq$ (equal or exceeding) 3 micron, so as to raise the temperature inside the sterilizer and reduce the warm-up time (the time the sterilizer takes to reach the operating conditions).

Identical to the essential features of the proposed invention *Method for Sterilizing Materials and Articles and a Device for Implementing the Same* as set out in Claim 1 are the following: things are exposed to pulse IR radiation while being simultaneously subjected to continuous IR radiation with the wavelength lying in another range.

One shortcoming of this method is that it is insufficiently effective in that it does not use radiation that is capable of destroying organic compounds. In order to do that, sterilization has to be conducted at rather a high temperature, and the articles being treated get heated to 170-180°C, which has an adverse effect on materials and articles. High temperature can damage them, since they get overheated and consequently lose

their functional properties. The screen coated with the converting layer, whose function is to generate IR radiation, begins operating only on reaching the activation temperature, i.e. the screen has to be warmed up and the operating conditions are attained, according to the examples given in this patent, during 5 to 7 minutes, which means that the screen has considerable thermal lag.

Besides, after sterilization is completed, even if it takes only 1 minute, it is necessary to cool down the sterilized articles (heated to 170-180°C) which, obviously, remain in the sterilizer and will cool down during a certain time which, in view of sterilizer thermal lag, will be 15 to 20 minutes at the very least. Furthermore, the screen coated with the converting layer which generates IR radiation does not ensure the uniformity of irradiating the articles being treated, since effective sterilization requires that IR radiation should fall on the articles on all sides simultaneously, and the radiation generated by the screen falls only within a certain solid angle.

An invention is known set out in US Patent # 5,350,927, *Radiation Emitting Ceramic Materials and Devices Containing Same*, which is taken as the prototype.

The patent discloses a method for sterilizing medical instruments and a device for sterilization.

The method for sterilization consists in exposing medical instruments to IR radiation generated by a ceramic material that is capable of absorbing energy and emitting IR radiation at one or more selective wavelengths at which the IR radiation from the first ceramic material is absorbed by a second ceramic material and the radiation from the second is directed at the articles (medical instruments) in order to sterilize them.

This patent describes a sterilizing device, which consists of: a chamber for holding materials and articles to be sterilized, a means for generating energy in the chamber, a first ceramic material made of a composition based on a rare-earth chromium oxide and a stabilizing composition containing sufficient amounts of an alkaline-earth metal spinel

and an alkaline-earth metal chromate together stabilizing the composition based on the rare-earth chromium oxide, which is placed inside the chamber to absorb energy from the means for generating it and to emit IR radiation at one or more selective wavelengths, which radiation is directed at the articles in order to sterilize them.

In this device the means for generating energy contains an energized element, which is brought in such contact with the first ceramic material that a substantial portion of the energy generated by the element is absorbed by the first ceramic material. When the first ceramic material is positioned adjacent to at least part of the energized element a substantial portion of the energy produced by the means for its generation is absorbed by the first ceramic material. The first ceramic material can be made in the form of a concentric tube around at least one of the elements and, if necessary, around each element, and the device can contain fixtures to support articles to be sterilized. To optimize operation the device additionally contains a second ceramic material placed inside the chamber to emit IR radiation with one or more wavelengths, which radiation can be either the same as emitted by the first ceramic material or different from it. This radiation is directed at the articles in order to sterilize them. The second ceramic material is placed inside the chamber to absorb the IR radiation from the first ceramic material and positioned near at least part of the first ceramic material so that a substantial portion of the IR radiation emitted by the first ceramic material is absorbed by the second ceramic material. The second ceramic material must be positioned adjacent to a substantial portion of the first ceramic material, e.g., in the form of a concentric tube around the first ceramic material. The second ceramic material can also be made in the form of a plate positioned adjacent to the energized element to absorb a substantial portion of the IR radiation emitted by the first ceramic material.

The first ceramic material is made from a rare-earth chromium oxide and a stabilizing composition containing sufficient amounts of an alkaline-earth metal spinel and an alkaline-earth metal chromate.

The second ceramic material contains:

Chromium oxide	Cr_2O_3	13.5 - 51.5%
Silicon dioxide	SiO_2	10.0 - 28.0%
Iron oxide	Fe_2O_3	15.0 – 35.0%
Calcium oxide	CaO	up to 15.0%
Aluminium oxide	Al_2O_3	up to 3.5%
Magnesium oxide	MgO	up to 3.0%
Copper (II) oxide	CuO	up to 2.0%

Identical to the essential features of the proposed invention *Method for Sterilizing Materials and Articles and a Device for Implementing the Same* as set out in Claim 1 are the following: the articles are exposed to IR radiation generated by a ceramic material that is capable of absorbing energy and emitting IR radiation at one or more selective wavelengths.

One shortcoming of the above method is that it is insufficiently effective, since by this method articles are not exposed to IR radiation that is capable of destroying organic compounds. To destroy organic compounds sterilization has to be carried out at rather a high temperature, and the articles get heated to 170-180°C, which has an adverse effect on the materials and articles to be treated, since high temperature can damage them.

Besides, this method does not ensure uniform exposure of the articles, yet effective sterilization requires that IR radiation should fall on the articles on all sides simultaneously.

Identical to the essential features of the proposed invention as set out in Claim 2 are the following: a device for sterilizing articles consists of a chamber for holding materials and articles to be sterilized, a means for generating energy inside the chamber consisting of at least one energized element, a fixture for supporting materials and articles to be sterilized, a first ceramic material situated around the means for generating energy inside the chamber and capable of absorbing the energy and emitting IR radiation at one or more selective wavelengths, a second ceramic

material capable of absorbing the energy and emitting IR radiation at one or more selective wavelengths and the radiation from the second ceramic material being different from the radiation emitted by the first ceramic material and directed at the materials and articles to be sterilized.

One shortcoming of the above device is its insufficient effectiveness, since this device sterilizes things only with radiation generated by the second ceramic material and does not use IR radiation that is capable of destroying organic compounds. Actual working models of the sterilizer according to US Patent # 5,350,927 do not provide the degree of sterilization given in the description, 125°C. This device ensures sterilization only when the articles are heated to 170-180°C. In order to destroy organic compounds sterilization has to be conducted at rather a high temperature, the articles are heated to 170-180°C, which has an adverse effect on the materials and articles to be treated, since they lose their functional properties as a result of overheating. Also, after sterilization is completed, even if it takes only 1 minute, it is necessary to cool off the articles heated to 170-180°C, which, obviously, have to remain inside the sterilizer until they cool off completely, i.e. they will be affected by high temperature not for 1, 2 or 3 minutes, but for a much longer period, up to 15 and more minutes. Furthermore, the radiation directed at the articles to sterilize them from the second ceramic material made in the form of a concentric tube around the first ceramic material or in the form of a plate positioned adjacent to the energized element does not ensure uniform irradiation of the articles being treated, since effective sterilization requires that the articles be exposed to IR radiation on all sides simultaneously.

The proposed invention *Method for Sterilizing Materials and Articles and a Device for Implementing the Same* as set out in Claims 1 and 2 is intended to raise sterilization effectiveness by exposing materials and articles to be sterilized to IR radiation whose wavelength ensures maximal sterilization without overheating the materials and articles, and by exposing materials and articles to be sterilized to uniform IR radiation which falls on the materials and articles on all sides simultaneously.

The principle of sterilization by the ceramic emitter rests on the fact that all bacteria, viruses and other microbes contain water. An IR ceramic, called the second ceramic material in the prototype, absorbs radiation from a first ceramic material, converts it and produces a short pulse at a wavelength of 16.0-16.25 micron with a high density, that is attuned to water molecules (H_2O). This pulse is absorbed by the water contained in microorganisms, and the water, turning to vapor, bursts the cell from inside, which results in killing all microbes: viruses, bacteria, fungi, as well as their spores.

Sterilizing materials and articles is done using pulse IR radiation generated by a ceramic material at a wavelength of 16.0-16.25 micron. In this range water has maximal absorption. At this wavelength organic matter becomes `transparent', that is, it does not absorb energy, and water becomes `black', that is, it has maximal absorption. Therefore the water molecules, under the influence of radiation with specified properties, evaporate, carrying away the excessive heat energy.

However, any organic matter consists of water (H_2O) and organic compounds, and their respective absorption spectra are different.

To raise sterilization efficiency, the present invention proposes treating materials and articles simultaneously, while exposed to pulse radiation at a wavelength of 16.0-16.25 micron, by other IR radiation whose wavelength falls within a range of 8.2-10.0 micron, generated by another ceramic material. This range of 8.2-10.0 micron corresponds to maximal absorption by organic matter.

All microbes reproduce by division. This process consists of strictly ordered biochemical pathways by which the number of microorganisms, including pathogenic ones, increases. By influencing the above pathways at a certain point by IR radiation in a range of 8.2-10.0 micron the processes of division and reproduction are brought to a halt. The microorganisms, unable to divide any longer, die, since their life-cycle is extremely short.

To achieve the set objective, in Claim 1 of the proposed invention *Method for Sterilizing Materials and Articles and a Device for Implementing the Same*, which involves treating materials and articles with IR radiation generated by a ceramic material capable of absorbing energy and emitting IR radiation, the materials and articles are simultaneously treated with IR radiation generated by the first ceramic material at a wavelength of 8.2-10.0 micrometres, which corresponds to the maximum of absorption of IR radiation by organic matter, and pulse IR radiation generated by the second ceramic material at a wavelength of 16.0-16.25 micrometres, at which the water contained in the microorganisms vaporises, and the IR radiation from both ceramic materials being directed uniformly on all sides at the materials and articles to be sterilized.

To achieve the set objective, in Claim 2 of the proposed invention *Method for Sterilizing Materials and Articles and a Device for Implementing the Same*, the device for sterilizing materials and articles consists of a chamber for holding materials and articles to be sterilized, a means for generating energy inside the chamber, a fixture for supporting materials and articles to be sterilized, a first ceramic material situated around the means for generating energy inside the chamber and capable of absorbing energy and emitting IR radiation at one or more selective wavelengths, a second ceramic material capable of absorbing energy and emitting IR radiation at one or more selective wavelengths, with the radiation from the second ceramic material being different from that from the first ceramic material and directed at the materials and articles to be sterilized.

The first ceramic material is a compound on the basis of lanthanum and contains the following ingredients, wt%:

Lanthanum aluminate	0.5 - 10.0
Yttrium chromite	0.5 - 3.0
Magnesium chromite	1.0 - 15.0
Cerium dioxide	0.1 - 1.0
Zirconium dioxide	0.5 - 5.0
Lanthanum chromite	the rest, i.e. 66.0 - 97.4

The first ceramic material makes it possible to produce IR radiation at a wavelength of 8.2-10.0 micron, which corresponds to the range of maximal absorption by organic matter, since this IR radiation, at a wavelength of 8.2-10.0 micron, destroys organic matter.

The first ceramic material described in the prototype makes it possible to produce IR radiation at a wavelength of 3.0 – 7.0 micron, and the properties of the first ceramic material according to the prototype differ from those of the first ceramic material according to the proposed invention. Besides, in the prototype the first ceramic material functions as a source of IR radiation to be absorbed by the second ceramic material, i.e., the IR radiation from the first ceramic material is not intended to sterilize materials and articles.

The second ceramic material is a compound on the basis of iron and contains the following ingredients, wt%:

Chromium oxide	28.0 - 32.0
Calcium carbonate	7.0 - 10.0
Iron oxide	33.0 - 35.0
Silicon dioxide	16.0 - 17.5
Magnesium oxide	4.0 - 6.0
Calcium oxide	2.5 - 3.5

The second ceramic material makes it possible to produce pulse IR radiation at a wavelength of 16.0-16.25 micron, which makes the water contained in microorganisms vaporize and burst the cell from inside, killing the microbes, viruses and bacteria.

The first and second ceramic materials are situated around the means for generating energy so as to make it possible to produce IR radiation directed at the materials and articles to be sterilized, simultaneously from each ceramic material.

Thus, simultaneously treating materials and articles to be sterilized with IR radiation at a wavelength of 8.2-10.0 micron capable of destroying organic compounds and pulse IR radiation in a range of 16.0-16.25 micron which is absorbed by the water contained in the microorganisms, with the water vaporizing and bursting the cell from inside, raises sterilization efficiency, and the sterilization takes place at a lower temperature, which makes it possible to produce sterilized materials and articles that are not damaged by overheating.

The device additionally contains an external chamber, and the chamber for holding materials and articles is placed in the external chamber with a gap, and the external chamber has a fan installed to blow the external surface of the chamber for holding materials and articles. Such a design makes it possible to lower the temperature inside the chamber for holding materials and articles and prevent their overheating.

Each energized element with the ceramic materials around it is provided with a reflecting system which, together with the reflector systems of the other energized elements, forms the internal surface of the chamber for holding materials and articles, with the number of energized elements, their arrangement and the shape of the reflective surface of each element being chosen so as to direct the most radiation in a uniform manner into the region of the fixture for supporting materials and articles, and the internal surface of the chamber for holding materials and articles being made of a material having high reflectance.

This design of the device makes for the uniformity of irradiating materials and articles to be sterilized: the IR radiation, falling on the internal surface of the chamber for holding materials and articles, which has high reflectance, is reflected and ultimately reaches the materials and articles; moreover, the IR radiation falls on the materials and articles on all sides simultaneously, ensuring that IR radiation reaches the parts of the materials and articles most difficult to reach.

The energized element within the device contains at least one halogen lamp or one high-resistance coil within a glass tube.

To optimize the operation of the device and make efficient use of the ceramic materials, the ceramic materials are painted onto the surface of the halogen lamp or glass tube. In particular, in the proposed device the means for generating energy consists of three energized elements, with one element situated at the bottom, and the other two at the top, of the chamber for holding materials and articles, the chamber for holding materials and articles made in the form of three trapezoid (Am. sense) reflectors joined together, and the fixture for supporting materials and articles to be sterilized made in the form of a tray connected to the door and capable of moving out of the chamber.

The method is implemented in the following way: the chamber for holding materials and articles to be sterilized is loaded with materials and/or articles that have been cleaned of debris and washed.

Halogen lamps coated with ceramic materials are used as IR radiation sources. To prepare an IR radiation source, the ceramic materials were first milled to a fine powder and then a glue based on polyvinyl alcohol was added to the powder. The resulting mixture was applied to the surface of a halogen lamp using a brush and dried. The halogen lamp is first coated with a ceramic material capable of absorbing energy and emitting pulse IR radiation at a wavelength of 16.0-16.25 micron and dried, then the dried layer is coated with a ceramic material capable of absorbing energy and emitting IR radiation at a wavelength of 8.2-10.0 micron, with the latter layer being painted in the form of rings or a spiral, so as to ensure simultaneous IR radiation from both ceramic materials.

In this way one can produce sources with the desired properties of IR radiation: pulse IR radiation with a wavelength of 16.0-16.25 micron and IR radiation with a wavelength of 8.2-10.0 micron.

As a ceramic material, capable of emitting IR radiation at a wavelength of 8.2 – 10.0 micron was used a ceramic material of the following composition, wt%:

Lanthanum aluminate	0.5 - 10.0
Yttrium chromite	0.5 - 3.0
Magnesium chromite	1.0 - 15.0
Cerium dioxide	0.1 - 1.0
Zirconium dioxide	0.5 - 5.0
Lanthanum chromite	the rest, i.e. 66.0 - 97.4

As a ceramic material capable of emitting pulse IR radiation at a wavelength of 16.0-16.25 micron was used a ceramic material of the following composition, wt%:

Chromium oxide	28.0 - 32.0
Calcium carbonate	7.0 - 10.0
Iron oxide	33.0 - 35.0
Silicon dioxide	16.0 - 17.5
Magnesium oxide	4.0 - 6.0
Calcium oxide	2.5 - 3.5
Aluminium oxide	1.5 - 2.0
Copper (II) oxide	0.5 - 1.0

When voltage is applied to the halogen lamps the ceramic layers begin heating and in 30 seconds reach the operating conditions. Materials and articles to be sterilized are held for a specified time, usually not longer than 15 minutes, in the chamber for holding materials and articles.

In the method described IR radiation from both ceramic materials is directed uniformly on all sides at the materials and articles to be sterilized which is achieved using the device according to Claim 2 of the present invention.

Example 1.

To conduct tests, a steel bar was used measuring 24.5 mm × 67 mm × 72 mm, in whose side a hole was bored measuring 6.5 mm in diameter and 50 mm deep, and a

steel tube with high reflectance, which was made of a material used for making medical instruments, with an outside diameter of 13 mm, an inside diameter of 10.5 mm, and a length of 76 mm. The tube imitated a medical instrument, having a weight corresponding to that of an average medical instrument. The steel bar had a greater weight, in order to test for the sterility of the largest medical instruments subjected to sterilization.

The test was carried out following standard procedure, using special test spores *SPORDEX* by the American company AMSCO which, according to the procedure, are destroyed at a temperature of 160°C for 25 minutes. The *SPORDEX* spores were attached to the test samples using special heat-resistant tape. The tests were done in the sterilizing device according to Claim 2 of the proposed invention. The test samples were put on a wire tray, which was placed in the chamber for sterilizing materials and articles. Three halogen lamps were used as a source of radiation, situated around the medical instruments to be sterilized, with each lamp coated with ceramic materials capable of simultaneously generating IR radiation with a wavelength of 8.2-10.0 micron and pulse IR radiation with a wavelength of 16.0-16.25 micron and each lamp provided with a dedicated reflecting system. Moreover, the IR radiation from each lamp by the reflecting systems was directed at the medical instruments to be sterilized simultaneously and uniformly on all sides. In this case the time of attaining the operating conditions was 30 seconds.

The tests used one bar and two tubes at a time. The arrangement of items was chosen in such a way so as to provide for the worst possible conditions for sterilization.

The first tube was placed at the back across the wire tray. One test spore was put inside the tube, another was below the tube. The second tube was placed in the front of the wire tray along it. With such a position, the IR radiation had the least possibility of getting inside the tube.

One test spore was put inside the second tube, another was below the tube.

Crosswise at the centre of the wire tray was placed the bar, with test spores attached, one by one: to the lower part of the bar, that is, below it, to its upper part, to its four sides, and one spore was put inside the hole at the side of the bar.

In the area of the maximal expected heating was placed a tube with a firmly attached temperature sensor to monitor the temperature of the test items.

The initial temperature of the items was 24°C.

The wire tray containing the items with the test spores attached in the manner described above was put in the chamber for holding materials and articles. The halogen lamps were turned on by pressing the button at the control panel, and the fan was simultaneously turned on. The guaranteed time to attain the operating conditions is 30 seconds. Actually, the operating conditions are attained instantaneously, since the diameter of the halogen lamp is small, only 6 mm, as is its weight, and the rate of heating is very high.

All in all, 25 tests were conducted, with different times of exposure to IR radiation. After testing the samples were used for bacteriological studies following standard procedure. As little exposure time as 5 minutes was sufficient to produce NO GROWTH results (NO GROWTH means complete sterilization). With an exposure time of 10 minutes the same NO GROWTH was obtained, but the temperature of the items rose to 130°C. Further increasing the exposure time did not result in the temperature of the items rising above 130°C. After completion of exposure the fan was left to operate for another 4.5 minutes to cool off the chamber and items.

Thus, the tests conducted have revealed the sterility of items after they were treated in the proposed sterilizing device for 5 minutes. In compiling the user's manual for the device the sterilization time was set at 15 minutes, so as to provide a threefold safety margin to fully ensure sterility.

Example 2.

The wire tray was loaded with various medical instruments—scalpels, scarifiers, pincers, syringes, etc.—that had been cleaned of debris and washed. The instruments had test spores attached, with the latter invariably put in the places most difficult to sterilize, and on the lower part in contact with the tray.

The tests were conducted following standard procedure, using special test spores *SPORDEX* by the American company AMSCO which, according to the procedure, are killed when exposed to a temperature of 160°C for 25 minutes. The *SPORDEX* spores were attached to the instruments using special heat-resistant tape.

The tests were carried out in the device for sterilization according to Claim 2 of the present invention. The instruments to be tested were put on the wire tray, which was then placed in the chamber for sterilizing materials and articles.

Three halogen lamps were used as a source of IR radiation, which were situated around the medical instruments to be sterilized, with each lamp being provided with a dedicated reflecting system to direct the IR radiation at the medical instruments uniformly on all sides. The lamps were coated with layers of ceramic materials making it possible to simultaneously produce IR radiation with a wavelength of 8.2-10.0 micron and pulse IR radiation with a wavelength of 16.0-16.25 micron. In this case the time of attaining the operating conditions was 30 seconds.

All in all 72 tests were conducted, with different times of exposure to IR radiation and different instruments.

After testing the instruments were used for bacteriological studies following standard procedure. With an exposure time of 3 minutes already in most of the tests, with different instruments tested, NO GROWTH results were achieved (NO GROWTH means complete sterilization), and the temperature of the instrument was 80°C. With an exposure time of 5 minutes in all the cases the result was NO GROWTH.

With an exposure time of 10 minutes also the NO GROWTH result was obtained, and the temperature of the instruments rose to 130°C. With further increasing the exposure time the temperature of the instruments did not exceed 130°C.

After the exposure time elapsed the fan was left to operate for another 5 minutes to cool off the chamber and instruments.

Thus, the tests conducted have revealed that treating instruments according to the method described above for 5 minutes makes them sterile.

To fully ensure sterility the sterilization time is set at 15 minutes, which is 3 times exceeds the time with which in all the test cases complete sterilization was achieved.

Figure 1 shows a cross-section of the proposed device for sterilization.

Figure 2 shows the side view;

Figure 3 shows the front view;

Figures 4 and 5 show the technological sequence of coating the halogen lamp with the ceramic materials;

Figure 6 shows the scheme of closing the chamber.

The device for sterilization consists of: external chamber 1, chamber 2 for holding materials and articles, which is installed in external chamber 1 with gap 3, fan 4, which is installed at the back of external chamber 1, so as to make it possible to blow the external surface of chamber 2 for holding materials and articles, a means for generating energy that consists of three energized elements— halogen lamps 5. Tube 6 of halogen lamp 5 is coated with first ceramic material 7 of the following composition, wt%:

Lanthanum aluminate	0.5 - 10.0
Yttrium chromite	0.5 - 3.0
Magnesium chromite	1.0 – 15.0
Cerium dioxide	0.1 - 1.0
Zirconium dioxide	0.5 - 5.0
Lanthanum chromite	the rest, i.e. 66.0 - 97.4

In its turn, first ceramic material 7 is coated with second ceramic material 8 of the following composition, wt%:

Chromium oxide	28.0 - 32.0
Calcium carbonate	7.0 - 10.0
Iron oxide	33.0 - 35.0
Silicon dioxide	16.0 - 17.5
Magnesium oxide	4.0 - 6.0
Calcium oxide	2.5 - 3.5
Aluminium oxide	1.5 - 2.0
Copper (II) oxide	0.5 - 1.0

Second ceramic material 8 is painted on top of first ceramic material 7 in the form of rings in such a way that the surface of halogen lamp 5, from which the IR radiation is emitted, is coated with alternating rings of the first and second ceramic materials.

Each halogen lamp 5 is provided with reflecting system 9, made in the form of trapezoid reflector 10. Three trapezoid reflectors 10, each situated around its halogen lamp 5, are joined together and form chamber 2 for holding materials and articles. The trapezoid reflectors 10 are made of aluminium, a material with high reflectance, which makes it possible to attain the maximal reflection of the IR radiation.

Halogen lamps 5 are situated: two at the top, one at the bottom of chamber 2. Situated at the centre of chamber 2 for holding materials and articles is the fixture for supporting materials and articles—wire tray 11. Wire tray 11 is connected to door 12 of external chamber 1. Wire tray 11 is mounted on telescopic rails 13 installed in cabinet 14, which is rigidly joined to chamber 2 for holding materials and articles. Telescopic rails 13 are provided with safety device 15, which tightly closes opening 16 in front wall 17 of chamber 2 for holding materials and articles. The distance between safety device 15 and door 12 exceeds that between front wall 17 of chamber 2 for holding materials and articles and front wall 18 of external chamber 1. Front wall 18 of external chamber 1 contains control panel 19 of the device for sterilizing materials and articles.

The device for sterilizing materials and articles operates in the following manner.

By operating the buttons on control panel 19 the sterilizer is turned on, that is, voltage is applied to halogen lamps 5 coated with first ceramic material 7 and second ceramic material 8; simultaneously, fan 4 is turned on, which blows chamber 2 for holding materials and articles, thereby cooling it. In 30 seconds halogen lamps 5 attain the operating conditions and begin emitting IR radiation simultaneously from both the first and the second ceramic materials. By pulling out door 12 tray 11 is simultaneously pulled out. The articles to be sterilized that have been cleaned of debris and washed in water are loaded on wire tray 11, door 12 is closed until safety device 15 tightly seals opening 16 in the front wall of chamber 2 for holding materials and articles.

After that, there is a gap left between front wall 18 of external chamber 1 and door 12 to ensure that the air blown by fan 4 after cooling chamber 2 for holding materials and articles can go out.

The articles placed on tray 11 are exposed to IR radiation from first ceramic material 7, whose wavelength is in a range of 8.2-10.0 micron, and pulse IR radiation from second ceramic material 8, whose wavelength is 16.0-16.25 micron. The IR radiation from halogen lamps 5 coated with ceramic materials 7 and 8 propagates in different directions. To concentrate the IR radiation and raise the efficiency and uniformity of treating the materials and articles to be sterilized, around halogen lamps 5 are installed trapezoid reflectors 10. The IR radiation, after being reflected from reflectors 10, is directed into the region of tray 11 at the materials and articles to be sterilized.

After exposing the materials and articles to the IR radiation for a specified time door 12 is pulled out and the sterilized materials and articles are taken from tray 11.

CLAIMS

1. A method for sterilizing materials and articles by exposing the materials and articles to IR radiation generated by a ceramic material capable of absorbing energy and emitting IR radiation with one or more selective wavelengths, characterized in that the materials and articles are simultaneously exposed to IR radiation generated by the first ceramic material, with a wavelength in a range of 8.2 – 10.0 micrometres, at which organic matter has maximal absorption of IR radiation, and to pulse IR radiation generated by the second ceramic material, with a wavelength in a range of 16.0 - 16.25 micrometres, at which the water contained in microorganisms vaporizes, and the said IR radiation from both the first and the second ceramic material being directed uniformly on all sides at the materials and articles to be sterilized.

2. A device for sterilizing materials and articles, consisting of a chamber for holding materials and articles to be sterilized, a means for generating energy inside the chamber, a fixture for supporting materials and articles to be sterilized, a first ceramic material situated around the means for generating energy inside the chamber and capable of absorbing energy and emitting IR radiation with one or more selective wavelengths, a second ceramic material capable of absorbing energy and emitting IR radiation with one or more selective wavelengths, with the radiation generated by the second ceramic material being different from that by the first ceramic material and directed at the materials and articles to be sterilized, characterized in that the first ceramic material, capable of emitting IR radiation at a wavelength of 8,2 - 10.0 micrometres, is a compound on the basis of lanthanum and contains the following ingredients, wt%:

Lanthanum aluminate	0.5 - 10.0
Yttrium chromite	0.5 - 3.0
Magnesium chromite	1.0 - 15.0
Cerium dioxide	0.1 - 1.0
Zirconium dioxide	0.5 - 5.0
Lanthanum chromite	the rest, i.e. 66.0 - 97.4

the second ceramic material, capable of emitting pulse IR radiation at a wavelength of 16,0 - 16.25 micrometres, is a compound on the basis of iron oxide and contains the following ingredients, wt%:

Chromium oxide	28.0 - 32.0
Calcium carbonate	7.0 - 10.0
Iron oxide	33.0 - 35.0
Silicon dioxide	16.0 - 17.5
Magnesium oxide	4.0 - 6.0
Calcium oxide	2.5 - 3.5
Aluminium oxide	1.5 - 2.0
Copper (II) oxide	0.5 - 1.0

with the ceramic material situated around the means for generating energy and making it possible to produce IR radiation directed at the materials and articles to be sterilized simultaneously from each ceramic material, and the device additionally has an external chamber (1), with the chamber (2) for holding materials and articles being installed in the external chamber (1) with a gap (3) between the two, the external chamber (1) is equipped with a fan (4) capable of blowing the external surface of the chamber (2) for holding materials and articles, and each energized element (5) surrounded by the ceramic materials is equipped with a reflecting system which, together with the reflecting systems of the other energized elements, forms the internal surface of the chamber (2) for holding materials and articles, and the number of energized elements (5), their arrangement and the shape of the reflective surface of each energized element (5) have been chosen such that the most radiation can be uniformly directed into the region of the fixture for supporting materials and articles to be sterilized (11), and the internal surface of the chamber (2) for holding materials and articles is made of a material that has high reflectance.

3 A device according to Claim 2, characterized in that the energized element (5) contains at least one halogen lamp or one high-resistance coil within a glass tube.

4 A device according to Claim 3, characterized in that the ceramic materials are painted onto the surface of the halogen lamp or glass tube.

5. A device according to Claim 2, characterized in that the means for generating energy consists of three energized elements (5), with one element situated at the bottom, and the other two at the top of the chamber (2) for holding materials and articles.

6 A device according to Claims 2 and 5, characterized in that the chamber (2) for holding materials and articles is made in the form of three trapezoid reflectors (10) joined together.

7. A device according to Claim 2, characterized in that the fixture for supporting materials and articles to be sterilized (11) is made in the form of a wire tray connected to the door and capable of being moved out of the chamber.

ABSTRACT

METHOD FOR STERILIZING MATERIALS ~~AND ARTICLES~~ AND ~~A~~ DEVICE FOR IMPLEMENTING THE SAME

The present invention relates to medicine, more particularly, to methods and devices for sterilizing materials and articles. The invention makes it possible to raise sterilization efficiency by treating the materials and articles to be sterilized simultaneously by pulse IR radiation with a wavelength in a range of 16.0-16.25 micron, at which the water contained in microorganism vaporizes, and IR radiation with a wavelength in a range of 8.2-10.0 micron, at which the absorption of IR radiation by organic matter is maximal, with the IR radiation being directed simultaneously on all sides at the materials and articles to be sterilized.

The IR radiation is produced by ceramic materials capable of absorbing energy and emitting IR radiation, with the ceramic materials being situated around a means for generating energy which consists of energized elements.

The chamber contains the energized elements coated with ceramic materials of the following compositions, wt%:

FORMULATION 1

Lanthanum aluminate	0.5 - 10.0
Yttrium chromite	0.5 - 3.0
Magnesium chromite	1.0 - 15.0
Cerium dioxide	0.1 - 1.0
Zirconium dioxide	0.5 - 5.0
Lanthanum chromite	the rest, i.e. 66.0 - 97.4

FORMULATION 2	
Chromium oxide	28.0 - 32.0
Calcium carbonate	7.0 - 10.0
Iron oxide	33.0 - 35.0
Silicon dioxide	16.0 - 17.5
Magnesium oxide	4.0 - 6.0
Calcium oxide	2.5 - 3.5
Aluminium oxide	1.5 - 2.0
Copper (II) oxide	0.5 - 1.0

The device consists of an external chamber in which is installed a chamber for holding materials and articles, with a gap between the two chambers, a fan for blowing the external surface of the chamber for holding materials and articles, with each energized element surrounded by ceramic materials being equipped with a reflecting system which, together with the reflecting systems of the other energized elements, forms the internal surface of the chamber for holding materials and articles, and the number of energized elements, their arrangement and the shape of the reflective surface of each element have been chosen such that the most radiation can be uniformly directed into the region of the fixture for supporting materials and articles, and the internal surface of the chamber for holding materials and articles is made of a material that has high reflectance.

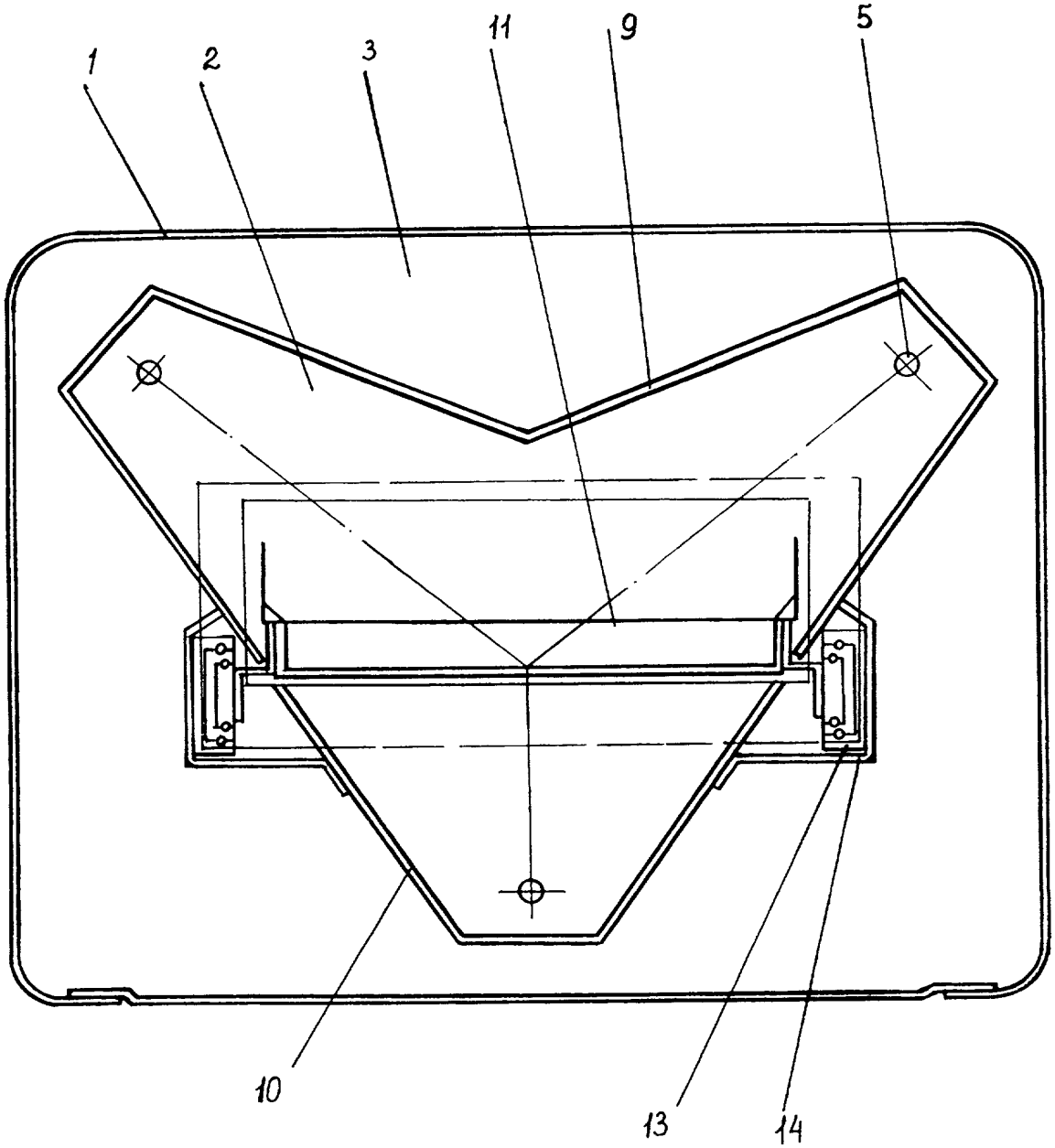

FIG 1

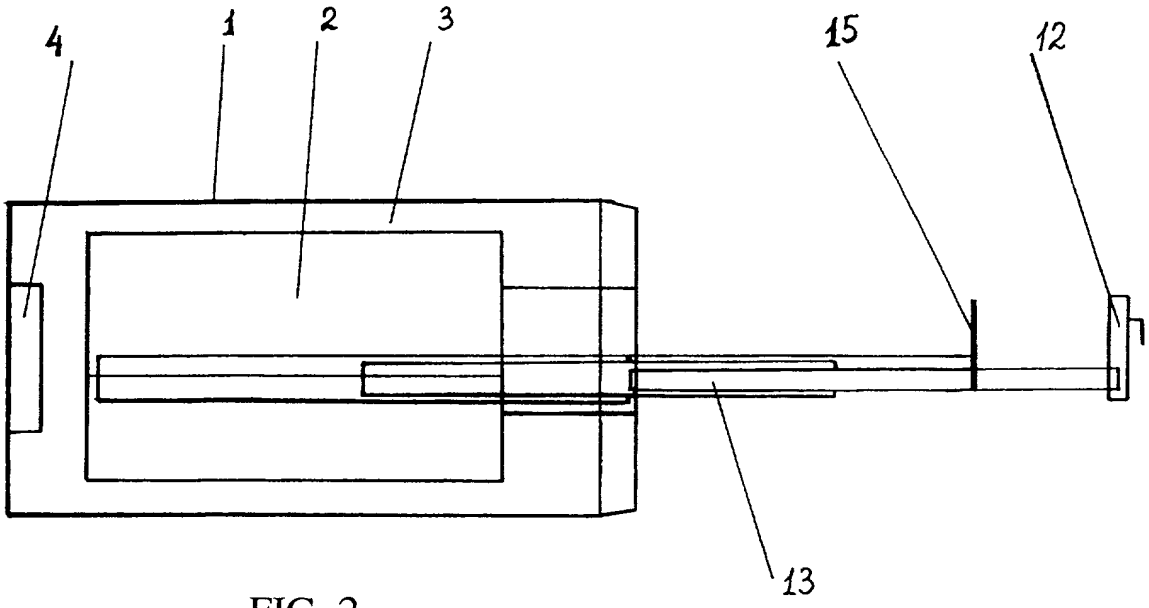

FIG 2

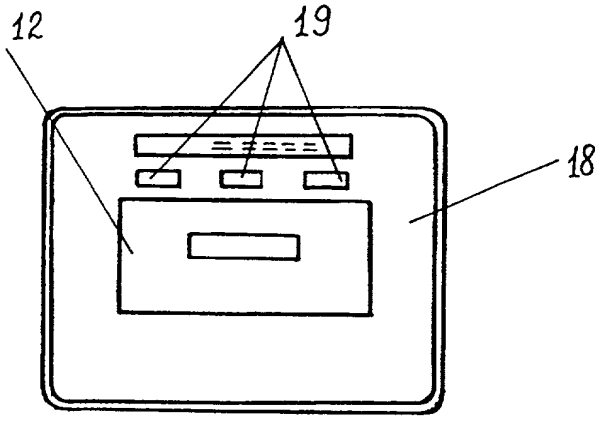

FIG 3

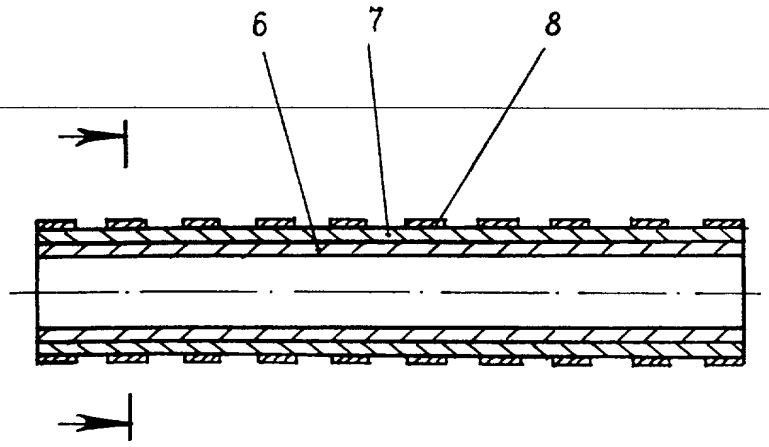

FIG 4

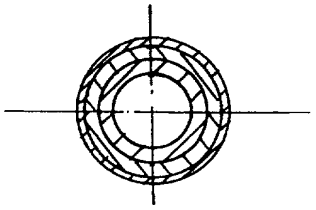

FIG 5

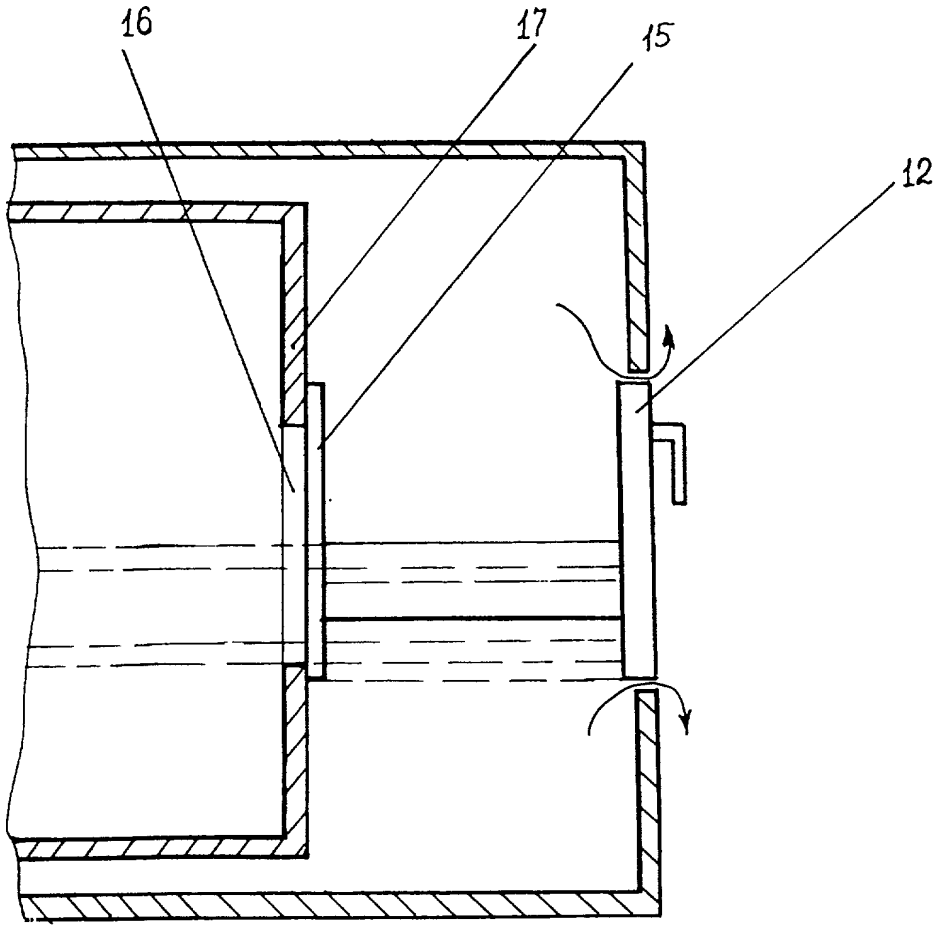

FIG 6

Docket No. 445

DECLARATION/POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled, METHOD FOR STERILIZING MATERIALS AND ARTICLES AND A DEVICE FOR IMPLEMENTING THE SAME, the specification of which is filed herewith.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

[ ] In compliance with this duty there is attached an information disclosure statement, 37 CFR 1.97.

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

ROBERT CHARLES HILL, REG. NO. 20,903

Send Correspondence to	Direct Telephone Calls to:
Robert Charles Hill 235 Montgomery Street #821 San Francisco, California 94104	Robert Charles Hill (415) 421-2080

EK473444496 US

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for Patent or inventor's certificate listed below and have also identified below any application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Such applications have been filed as follows:

EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION

Country	Application No.	Date of Filing	Date of Issue	Priority Claimed
PCT	PCT/IB99/00267	02-15-99	---	Yes
UZ	HDP 9800112.1	02-20-98		Yes

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first inventor: Rustam Rakhimov

Inventor's Signature _____

Date 11.08.00 Country of Citizenship: Uzbekistan

Residence Tashkent, UZBEKISTAN

Post Office Address: Ergashev Street, 54
Tashkent, 700084
Uzbekistan